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1. A system for generating a dataset for use in a cluster analysis, the system comprising one or more processors; and one or more memories coupled to the processor, the one or more memories to store computer-executable instructions that, when executed by the one or more processors, cause the one or more processors to perform operations comprising:
- (a) computing a field of view (FOV) sampling grid for each of a plurality of areas of interest (AOI) within obtained image data;
 - (b) acquiring multi-spectral data and/or hyper-spectral data at single or multiple z-planes for each computed FOV;
 - (c) unmixing signal data corresponding to one or more detectable markers from the collected multi-spectral data and/or hyper-spectral data for each computed FOV;
 - (d) identifying FOVs to be compared as a group in the cluster analysis; and
 - (e) storing selected features of interest of the identified FOVs in the dataset, wherein the features of interested are selected by automatically segmenting the unmixed signals corresponding to the one or more detectable marker signals in each of the selected FOVs.

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